



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,007	09/30/2003	Tingkai Li	SLA 0793	7277
27518	7590	05/31/2005	EXAMINER	
DAVID C RIPMA, PATENT COUNSEL SHARP LABORATORIES OF AMERICA 5750 NW PACIFIC RIM BLVD CAMAS, WA 98607			TALBOT, BRIAN K	
			ART UNIT	PAPER NUMBER
			1762	

DATE MAILED: 05/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/677,007

Applicant(s)

LI ET AL.

Examiner

Brian K. Talbot

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

Art Unit: 1762

1. Claims 1-16 remain in the application.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "thin" in claims 1 and 9 is a relative term that renders the claim indefinite. The term "thin" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The term "completing" is vague and indefinite. It is unclear what the term "completing" encompasses.

With respect to claims 2,3,10 and 11, the phrase "said preparing step includes forming an oxide layer/high-k oxide on the silicon substrate" is confusing. Should this recite in the "depositing" step or is there an oxide layer formed first and then atop this layer an indium-containing layer is formed? Clarification is requested.

The term "high-k" in claim 3 and 11 is a relative term that renders the claim indefinite. The term "high-k" is not defined by the claim, the specification does not provide a standard for

Art Unit: 1762

ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

With respect to claim 5 and 13, the phrase “forming a silica dioxide trench structure” is unclear. How is this performed from etching the indium-containing film? Where does the “silicon dioxide” come from when the substrate is silicon and the coating is indium-containing?

Claims 4,6-9,12 and 14-16 are rejected as being dependent upon a rejected base claim.

### ***Double Patenting***

3. Claims 1-16 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-18 of copending Application No. 10/676,983 and claims 1-19 of copending Application No. 10/780,919. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims recite forming an indium oxide film on a silicon substrate, etching or patterning the indium oxide film, forming a ferroelectric film of PGO thereon, and completing the device.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-5 and 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (6,825,519) in combination with Shepherd (5,003,428).

Li et al. (6,825,519) teaches selectively depositing PGO thin film to form a ferroelectric device. A silicon oxide layer is formed on a silicon substrate, a bottom electrode is formed and patterned thereon, a PGO layer is applied, annealed and a top electrode is formed to complete the device (abstract, col. 1, lines 40-60).

Li et al. (6,825,519) fails to teach a patterned indium oxide layer as the bottom electrode.

Art Unit: 1762

Shepherd (5,003,428) teaches electrodes for ceramic oxide capacitors. Shepherd (5,003,428) teaches that indium oxide and indium tin oxide are used as materials for thin film ferroelectric ceramic capacitors (col. 2, lines 40-50).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have substituted the electrode material of Li et al. (6,825,519) process by incorporating indium oxide for the electrode material as evidenced Shepherd (5,003,428) with the expectation of achieving similar success.

Claims 7,8,15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (6,825,519) in combination with Shepherd (5,003,428) further in combination with Li et al. (6,664,116).

Features described above are incorporated here.

Li et al. (6,825,519) in combination with Shepherd (5,003,428) fail to teach the claimed processing parameters for forming the PGO film.

Li et al. (6,664,116) teaches the claimed processing parameters for forming the PGO film (col. 2, line 10 – col. 3, line 50).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Li et al. (6,825,519) in combination with Shepherd (5,003,428) by forming the PGO film as detailed by Li et al. (6,664,116) with the expectation of achieving similar results.

Art Unit: 1762

Claims 6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (6,825,519) in combination with Shepherd (5,003,428).

Features described above are incorporated here.

Li et al. (6,825,519) in combination with Shepherd (5,003,428) fail to teach the claimed processing parameters for forming the In<sub>2</sub>O<sub>3</sub> film.

While the Examiner acknowledges this fact, it is the Examiner's position that sputtering indium oxide films are conventional in the art and the processing parameters would be a matter of design choice of one practicing in the art dependent upon the desired final product.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K. Talbot whose telephone number is (571) 272-1428. The examiner can normally be reached on Monday-Friday 6AM-3PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Application/Control Number: 10/677,007

Page 7

Art Unit: 1762

 5/26/05

Brian K Talbot  
Primary Examiner  
Art Unit 1762

BKT